

6. a) i)  $4^2 + 4^3 = (4)(4) + (4)(4)(4)$   
 $= 16 + 64$   
 $= 80$

Evaluate the powers, then add.

ii)  $5^3 + 5^6 = (5)(5)(5) + (5)(5)(5)(5)(5)(5)$   
 $= 125 + 15\,625$   
 $= 15\,750$

Evaluate the powers, then add.

b) i)  $6^3 - 6^2 = (6)(6)(6) - (6)(6)$   
 $= 216 - 36$   
 $= 180$

Evaluate the powers, then subtract.

ii)  $6^3 - 6^5 = (6)(6)(6) - (6)(6)(6)(6)(6)$   
 $= 216 - 7776$   
 $= -7560$

Evaluate the powers, then subtract.

7. In the 2nd row, 36 should be positive, because  $(-6)^2 = (-6)(-6)$   
 $= 36$

Then, the student should have multiplied first  $4 \times 16$ , not added  $9 + 4$ .

The correct solution:

$$3^2 + 2^2 \times 2^4 + (-6)^2 = 9 + 4 \times 16 + 36$$

$$= 9 + 64 + 36$$

$$= 109$$

10. a)  $(3 + 4)^2 \times (4 - 6)^3 = 7^2 \times (-2)^3$   
 $= (7)(7) \times (-2)(-2)(-2)$   
 $= 49 \times (-8)$   
 $= -392$

Do the operations in the brackets first.

Then evaluate the powers.

Then multiply.

b)  $(8 \div 2^2 + 1)^3 - 3^5$   
 $= (8 \div 4 + 1)^3 - 3^5$   
 $= (2 + 1)^3 - 3^5$   
 $= 3^3 - 3^5$   
 $= (3)(3)(3) - (3)(3)(3)(3)(3)$   
 $= 27 - 243$   
 $= -216$

Evaluate the power in the brackets first.

Then divide in the brackets.

Then add in the brackets.

Then evaluate the powers.

Then subtract.

c)  $4^3 \div [8(6^0 - 2^1)]$   
 $= 4^3 \div [8(1 - 2)]$   
 $= 4^3 \div [8(-1)]$   
 $= 4^3 \div (-8)$   
 $= 64 \div (-8)$   
 $= -8$

Evaluate the powers in the brackets first.

Then subtract in the brackets.

Then multiply in the square brackets.

Then evaluate the power.

Then divide.

d)  $9^2 \div [9 \div (-3)]^2$   
 $= 9^2 \div (-3)^2$   
 $= 81 \div 9$   
 $= 9$

Divide in the brackets first.

Then evaluate the powers.

Then divide.

e)  $(2^2 \times 1^3)^2$   
 $= (4 \times 1)^2$   
 $= 4^2$   
 $= 16$

Evaluate the powers in the brackets first.

Then multiply in the brackets.

Then evaluate the power.

f)  $(11^3 + 5^2)^0 + (4^2 - 2^4)$  Evaluate the powers first.  
 $= 1 + (16 - 16)$  Then subtract in the brackets.  
 $= 1 + 0$  Then add.  
 $= 1$

12. Evaluate the expression to determine the cost.

$$70 \times 3^2 + 60 \times 3^2 \times 0.75 = 70 \times 9 + 60 \times 9 \times 0.75 \quad \text{Evaluate the powers first, then multiply.}$$

$$= 630 + 405 \quad \text{Then add.}$$

$$= 1035$$

It costs \$1035 to tile the floor.

16. a)  $(14 + 10)^2 \times (21 - 28)^3$

I used mental math to evaluate the brackets:  $14 + 10 = 24$ , and  $21 - 28 = -7$

Then I used the calculator:

$$24^2 \times (-7)^3 =$$

$$-197\,568$$

b)  $(36 \div 2^2 + 11)^3 - 10^5$

I used mental math to evaluate the power inside the brackets:  $2^2 = 4$

Then I used the calculator:

$$(36 \div 4 + 11)^3 - 10^5 =$$

$$-92\,000$$

c)  $\frac{12^3}{36(12^0 - 13^1)}$

I used mental math to evaluate  $12^0 = 1$  and  $13^1 = 13$ .

Then I used the calculator:

$$12^3 \div (36(1 - 13)) =$$

$$-4$$

d)  $\frac{81^2}{9^2 + (-9)^2}$

$$81^2 \div (9^2 + (-9)^2) =$$

$$40.5$$

e)  $(14^2 + 6^3)^2$

$$(14^2 + 6^3)^2 =$$

$$169\,744$$

f)  $(11^3 + 25^2)^0 + (27^2 - 33^4)$

I know that a power with exponent 0 is equal to 1, so the first bracket is equal to 1.

$$1 + 27^2 - 33^4 =$$

$$-1\,185\,191$$

18. a)  $(-6)^2 - 2[(-8) \div 2]^2 = 36 - 2(-4)^2$   
 $= 36 - 2(16)$   
 $= 36 - 32$   
 $= 4$

Marcia's answer is correct.

b) I think Robbie forgot that the square of a negative number is positive when he evaluated  $(-4)^2$ .

$$\begin{aligned}(-6)^2 - 2[(-8) \div 2]^2 &= 36 - 2(-4)^2 \\&= 36 - 2(-16) \\&= 36 + 32 \\&= 68\end{aligned}$$

I think Nick forgot that the square of a negative number is positive when he evaluated  $(-6)^2$ .

$$\begin{aligned}(-6)^2 - 2[(-8) \div 2]^2 &= -36 - 2(-4)^2 \\&= -36 - 2(16) \\&= -36 - 32 \\&= -68\end{aligned}$$

**20. a)**  $(10 + 2) \times 3^2 - 2 = 12 \times 3^2 - 2$   
 $= 12 \times 9 - 2$   
 $= 108 - 2$   
 $= 106$

Add within the brackets first, then evaluate the power.

Then multiply.

Then subtract.

**b)**  $10 + 2 \times (3^2 - 2) = 10 + 2 \times (9 - 2)$   
 $= 10 + 2 \times 7$   
 $= 10 + 14$   
 $= 24$

Evaluate the power and subtract within the brackets first.

Then multiply.

Then add.

**c)**  $(10 + 2) \times (3^2 - 2) = 12 \times (9 - 2)$   
 $= 12 \times 7$   
 $= 84$

Evaluate the brackets first.

Then multiply.

**d)**  $(10 + 2 \times 3)^2 - 2 = (10 + 6)^2 - 2$   
 $= 16^2 - 2$   
 $= 256 - 2$   
 $= 254$

Multiply, then add within the brackets first.

Then evaluate the power.

Then subtract.